BELLCOMM, INC.
1100 Seventeenth Street, N.W. Washington, D. C. 20036

SUBJECT: Remote Sensing Session at Annual Geological Society Meeting (NE Section) February 15-17, 1968, Washington, D. C. Case 710

DATE: April 11, 1968

FROM: B. E. Sabels
W. L. Smith

ABSTRACT

The writers attended the Annual Meeting of the Northeastern Section of The Geological Society of America, February 15-17, 1968. The remote sensing session drew the major interest of the assembled geologists. Comments from the floor emphasized both the lack of dissemination of technical information as to the potential of sensing techniques, and an unrealistic concept of current capabilities held by many of the geologists present.

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MEMORANDUM FOR FILE

The Technical Session on Remote Sensing at the annual meeting of the Northeastern Section of the Geological Society of America, February 15-17, 1968 was of particular interest. The session was chaired by J. DeNoyer and C. J. Robinove, U.S.G.S. Highlights of the session follow.

MULTISPECTRAL PHOTOGRAPHY

G. Brown, Boston College, and J. Cronin, Air Force Cambridge Research Laboratories, presented the results of a multispectral photographic study of the Red Bed facies, Menas Basin, Nova Scotia. The investigators were able to identify specific strata and to point out facies characteristics not identifiable by conventional field techniques. Narrow band photography and spectrophotometry studies of the various rocks showed that their reflectivity increased as the wavelength of the incident radiant energy increased.

SIDELOOKING RADAR IMAGERY

A. Kover and G. Luttrell, USGS, presented an aerial panorama of selected physiographic regions from an aircraft flight covering much of the northeastern U.S.A. Inasmuch as radar furnishes illumination at its own frequency, the side looking radar provides a uniform imagery, regardless of clouds or time of day. An oblique viewing angle is used to emphasize terrain characteristics; a direction may be chosen which maximizes the resolution of sought-after details. The continuous imagery clearly demonstrated known differences in physiography and structure in classical geological areas.

R. Reeves, U.S.G.S., described the use of SLR imagery in identifying geological structures, and indicated where radar was able to recognize certain structural features in better detail than by means of photography or other imagery. This is because radar is able to view at lower frequencies than IR or photography, and thereby can pierce clouds and some degree of vegetation.

INFRARED IMAGERY

R. Stingelin, HRB-Singer, State College, Pennsylvania, briefed the session on the significant parameters to be considered for regional airborne IR surveys for geological purposes. The major points brought out were:

High resolution detectors with small exposed sensing area are best for geological surveys, to bring out details of structure and stratigraphy.

On the other hand, high sensitivity (large area) detectors are best for hydrological surveys, because general geological detail is less important and subtle temperature differences due to ground water are of exclusive interest.

Nighttime surveys for either geology or hydrology are preferrable to daytime surveys, because of relatively stable temperature conditions.

Longwave IR detectors and shortwave IR detectors are equally interpretable for geological and hydrological surveys. At long wavelengths, (8-14μ), we observe molecular forces. At short wavelengths, (1-4μ), the radiation arises from external electrons in the atoms.

Restrictive criteria for IR imagery include:

Flight lines must permit mosaicking of the central 70° of each strip.

Flight lines must be flown parallel to prevailing wind direction due to possible crabbing of the aircraft (diagonal movement caused by heading into a crosswind to counteract drift) and the misleading acquisition of terrain off the nadir line.

GEOLOGIC TERRAIN PHOTOGRAPHY

P. D. Lowman, NASA, discussed geologic applications of Gemini terrain photography. The Gemini (S-5) experiment included hand-held Hasselbladt and Maurer 70mm cameras, using 38, 80, and 250mm lenses. Ektachrome, Ektachrome IR, and Anscochrome film were used. The photography identified an unknown Quaternary lava field in Chihuahua, will lead to revision of the geologic map of Lower California, failed to identify the Texas Lineament in the southwestern U.S.A., indicated that the Oman Range of Arabia is not tectonically related to the Kirthar Range of Pakistan, and indicated the effect of wind erosion on bedrock in the Sahara.

The remote sensing session drew the major interest of the assembled geologists at an otherwise routine regional meeting of the national society. Comments from the floor emphasized both the lack of dissemination of information as to the potentials of remote sensing, and an unrealistic concept of current capabilities. For example, some comments indicated the belief that current remote sensing capabilities include the identification of specific ores and the ability to penetrate thick overburden; whereas in fact current capabilities are restricted to the larger structural, thermal, and moisture patterns. As for mineral resources, current capabilities are essentially restricted to the interpretation of these patterns and anomalies to known regional geology.

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